

CLAIMS

What is claimed is:

1. A semiconductor fabrication alignment and exposure equipment comprising:
an exposure and alignment unit including a light source and a lens;
a variable transmission mask under the lens to at least indirectly measure focus and adjust the focus in real time in response to determining that the focus is out of specification; and
a stage on which a wafer is placed for exposure to the light source through one of a mask and a reticle.
2. The equipment of claim 1, wherein the variable transmission mask normally has a substantially high transmission of light rating that can be adjusted downward to adjust the focus in response to determining that the focus is out of specification.
3. The equipment of claim 2, further comprising a mask adjuster to adjust the transmission of light rating downward to adjust the focus in response to determining that the focus is out of specification.

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4. The equipment of claim 1, wherein the variable transmission mask comprises a liquid crystal display (LCD) that can be darkened to reduce transmission of light to adjust the focus in response to determining that the focus is out of specification.

5. The equipment of claim 4, further comprising a mask adjuster to darken the LCD to reduce the transmission of light to adjust the focus in response to determining that the focus is out of specification.

6. The equipment of claim 1, wherein the variable transmission mask comprises a sensor to at least indirectly measure the focus.

7. The equipment of claim 1, further comprising a heating factor adjuster to adjust a heating factor of the exposure and alignment unit to adjust the focus in response to determining that the focus is out of specification.

8. The equipment of claim 1, further comprising a stage adjuster to adjust the stage vertically to adjust the focus in response to determining that the focus is out of specification.

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9. The equipment of claim 1, wherein the variable transmission mask directly measures the focus.

10. The equipment of claim 1, wherein the variable transmission mask indirectly measures the focus by measuring heat of the lens of the exposure and alignment unit.

11. A lens heating compensation mechanism for a semiconductor fabrication and exposure equipment comprising:

a sensor to at least indirectly measure focus;

a variable transmission mask under a lens of the equipment, normally having a substantially high but adjustable transmission of light rating; and

a mask adjuster to adjust the transmission of light rating downward to adjust the focus in response to the sensor determining that the focus is out of specification.

12. The lens heating compensation mechanism of claim 11, further comprising at least one of:

a heating factor adjuster to adjust a heating factor of the equipment to adjust the focus in response to the sensor determining that the focus is out of specification; and

a stage adjuster to adjust a stage of the equipment vertically to adjust the focus in response to the sensor determining that the focus is out of specification.

13. The lens heating compensation mechanism of claim 12, wherein the sensor, the mask adjuster, the heating factor adjuster, and the stage adjuster are part of electronics of the lens heating compensation mechanism.

14. The lens heating compensation mechanism of claim 11, wherein the sensor directly measures the focus.

15. The lens heating compensation mechanism of claim 11, wherein the sensor indirectly measures the focus by measuring heat of the lens of the exposure and alignment unit.

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16. A method comprising:

at least indirectly measuring focus of a semiconductor fabrication exposure and alignment equipment; and

in response to determining that the focus is out of specification, adjusting in real time a transmission of light rating of a variable transmission mask below a lens of the equipment, to adjust the focus.

17. The method of claim 16, further comprising, in response to determining that the focus is out of specification, adjusting a heating factor of the equipment to adjust the focus.

18. The method of claim 16, further comprising, in response to determining that the focus is out of specification, adjusting vertically a stage of the equipment on which a semiconductor wafer is placed, to adjust the focus.

19. The method of claim 16, wherein at least indirectly measuring the focus comprises indirectly measuring the focus by measuring heat of the lens of the equipment.

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20. The method of claim 16, wherein at least indirectly measuring the focus comprises directly measuring the focus.